

FINE-TUNING THE MIND

A powerful technology reaches our shores, one which holds promise for managers, for schoolchildren and students, for corporations, and invalids. We're talking about empowerment of the mind-brain. How? Just listen ...

by Pierre Roxburgh

Tucked away somewhere in the foothills of the Blue Ridge mountains in Virginia, U.S.A., lie a few unprepossessing buildings which constitute the nucleus of The Monroe Institute — a privately-funded organisation responsible for some of the most innovative research into human consciousness taking place today.

Over the last twenty-five odd years they have developed and refined a unique auditory guidance system which has a remarkable range of applications. These extend from treating insomnia, to accelerating rehabilitation of victims of brain trauma, and enhancing the learning environments of normal and disabled children, right through to creativity training, stress management and culture change in corporate environments.

It is only in recent decades that the conventional scientific and medical fraternities have become truly aware of the immense resource that is the human brain. This awareness has grown by leaps and bounds, starting with Einstein's basic intuition that he used only 10% of his total brain capacity. Today, there are extremely accurate statistics which point to such a degree of mind-brain under-utilisation (as much

by all the so-called geniuses as by the man-in-the-street) that scientists are almost being railroaded into a line of research traditionally reserved for the fringe operators.

Twenty years ago, mainstream researchers would have been laughed at, and run out of Orthodoxville for even whispering that they might like to take a cross-section of Einstein's brain and check out the neuronc landscape. As with all human endeavour, respectability is a function of subjective cultural perceptions. Recently Einstein's brain went under the electron microscope. And ... surprise, surprise ... it was found that, yes indeed, there are physiological differences at a cellular level between Albert and the rest of us.

Why is there this reluctance to investigate human thought, what drives it, and to what extent it can be "jacked up"? Why do the residents of Orthodoxville shy away from this type of research? The analogy of callow pre-adolescents poring over pornographic literature comes to mind — everyone wants to do it, but they're all too scared in case they get caught. And when the opportunity does present itself, it's done in utmost secrecy.

On a more serious note, the much-vaunted "Age of Reason" and

its legitimate child, the "Scientific Method", have been responsible for the dearth of research in this area. Orthodox scientific segments of our culture depend on objective and observable phenomena to illuminate the path of "progress". The investigation of human consciousness does not yield such phenomena — it requires subjective feedback from laboratory subjects.

However, the last ten years have borne witness to a reluctant compromise between the purists and the more honest brokers, who could no longer ignore the anecdotal and empirical evidence of the possibilities contained within the mind-brain. It would seem that the purists, while remaining publicly sceptical, privately take an extremely healthy interest in what's going on.

It is against this backdrop that The Monroe Institute have been quietly forging ahead with their research, inadequately staffed, under-capitalised, and producing nothing short of astounding results in the field of mind-brain empowerment.

What if it were possible to induce specific mind-brain states which would enable the individual to become highly creative, or highly receptive, or highly focused?

What is "mind-brain empowerment"? Firstly, it is necessary to understand what is implied by the term "mind-brain". The brain itself is a sophisticated piece of neurochemical apparatus — fair enough, everyone knows that. But then along come the philosophers who've been squabbling about human consciousness for some six hundred years. The contentious issue being ... "Is the mind with all its outputs merely a neurochemical functionary, or is it logically distinct from the brain, occupying higher ground and exploiting the brain's neurochemistry for its own ends?"

Who cares anyway? The important thing is that this metaphysical antihill has been leap-frogged and has indirectly given birth to the concept of the "mind-brain" — a unified entity which makes no claim one way or the other. It also perfectly describes the totality which drives conscious thought. And so, "mind-brain empowerment" is just that: any process which enhances activity of the mind-brain subjectively or objectively, be it De Bono's thinking tools, autogenics, bio-feedback exercises, skills training or formal learning.

What distinguishes The Monroe Institute from the rest is that their point of departure is located a few steps further back than anyone else's. The mind-brain is not merely something which can be "taught" to operate more efficiently. There are myriad shades of functioning, some of which are better suited to doing some things, and others better suited to doing others. Simply put, it's no good trying to perform integral calculus while you're fast asleep.

This may seem a bit trite, but it does open up a whole new box of tricks. What if there were discrete psychological states, or stages of consciousness, which are conducive to particular thought modalities? What if it were possible to induce specific mind-brain states which would enable the individual to become highly creative, or highly receptive, or highly focused?

And this has been precisely the focus of The Monroe Institute over the last twenty-five years. They have painstakingly isolated a whole spectrum of mind-brain states which help people to optimise their

performance in a variety of fields. Furthermore, they have developed a low-cost audio technology which allows the man in the street access to these productive states — a development described by human resource practitioners as "one of the major advances of the 20th Century".

How can this be? Surely a brain is a brain is a brain and any improvement in its operation is a function of learning? Not necessarily. Dr Giorgio Lozanov of "superlearning" fame had already been flirting with "altered states" back in the late '50s. This intrepid Bulgarian tried to get his subjects to accelerate their learning of foreign languages by introducing largo movements of the baroque composers into the learning environment. More recently, Dr David Lewis popularised the benefits of "alpha brain states" with his famous toy train bio-feedback apparatus.

The Monroe Institute's auditory guidance technology makes it possible to accurately target and induce highly specific states within the mind-brain, with success in the above-quoted scenarios. To understand the process, it is necessary to become familiar with some elementary facts about the brain.

The brain's activity is electrical in nature as evidenced by the low-frequency brain waves which can be detected and measured using conventional EEG equipment. No-one seems to know which part(s) of the brain generate these electrical waves, although theories of origin abound. What is certain is that there is a definite correlation between the presence of particular types of waves and psychological states as illustrated below. (For the uninitiated, the abbreviation Hz refers to "Hertz" — a measure of frequency or "cycles per second").

Table 1

Beta	13-30 Hz	Alertness
Alpha	9-12 Hz	Relaxation
Theta	4-8 Hz	Light Sleep
Delta	0-4 Hz	Deep Sleep

Don't be fooled. The brain emits waves in all these frequency bands continuously. It just so happens that when one is awake and alert, brain waves in the Beta band of activity seem to dominate. (The dominant activity at any one time is known as the "primary brain wave activity"). Likewise, when one is deeply asleep, the primary activity is located in the Delta band.

The mind-brain has a natural capacity to respond to sound. There's nothing new here. If people listen to the Rolling Stones' "Can't get no Satisfaction", chances are they'll get hyped up. On the other hand, if they listen to a good piece of Vivaldi, relaxation becomes the order of the day, and they may even nod off to sleep. And if they did all this while attached to EEG electrodes, distinctive changes in the electrical brain wave patterns would be noticeable.

In their early days of research, The Monroe Institute identified an interesting natural phenomenon: if a person's auditory environment is dominated by a specific sound frequency, the brain tends to duplicate the frequency within its own physiology — it becomes "entrained" to the sound frequency. The principle of resonant entrainment is well established in the physical sciences. An opera singer can shatter a window if she sings at the right pitch. A crystal wine glass will start humming if a moistened finger tracks around its circular rim.

The brain's ability to produce electrical waves with frequencies comparable to the sound frequency being listened to is called the Frequency Following Response (FFR). In order to use FFR to

influence stages of consciousness (as reflected in Table 1), an individual would have to listen to sound frequencies of 30 Hz or less. There is a problem with this — the human ear is physiologically incapable of detecting such low frequencies.

This minor hurdle is overcome by using "binaural beats". Binaural beats are produced within the physiology of the listener when slightly different sound frequencies are introduced simultaneously into each ear. The brain notices that two different frequencies are coming in at the same time and tries to do something about it. In trying to bridge the gap between the sounds, the brain independently produces a third frequency which is the difference between the two. This third frequency is not a sound in the true sense of the word, but may be perceived as an oscillating sound. The process of producing this third frequency is known as binaural beat stimulation.

Combining the effects of these two auditory phenomena (FFR and binaural beats), it is possible to make people alert and focused, or relaxed, or put them to sleep. This startling result has an interesting spin-off.

Binaural beat stimulation tends to produce a state of low frequency, inter-hemispheric synchronisation. (See Figure 1). This means that the frequency, amplitude and phasing of the brain waves is the same for each brain hemisphere. This then, in the vernacular, is "whole brain thinking" or "whole brain integration".

Anyone familiar with the now widely accepted model of lateralisation of brain function will immediately perceive the benefits of this "whole brain" state. The "before" and "after" pictures in Figure 1 are pictorial representations of the brain waves produced by a neuromapper — a digital device which translates the corrugated lines of an EEG strip chart into colour contour maps of the neocortex. Notice the wonderfully symmetrical pattern in 'after' in Figure 1, produced after a short period of exposure to these special sound frequencies.

The entire process is accessible through stereo cassettes which may be played on any normal stereo device and listened to via headphones. It is a noninvasive process — an individual exposed to the frequencies is not necessarily affected by them. A conscious and rational choice to receive the benefits must be made on the part of the listener.

Bear in mind that resonant entrainment of brain waves may also occur via the tactile and visual pathways. Vibrations in a water bed

have been shown to produce entrainment and there are numerous devices on the market which use flashing lights for the same purpose. So, brain wave entrainment is, in itself, nothing remarkable. The secret is to make practical use of the phenomenon. To this end, The Monroe Institute has spent over two decades carefully blending, sequencing and attenuating different sound frequencies, and combinations thereof, which induce productive psychological states.

This, then, is the body of the Hemi-Sync technology: a number of carefully synthesised frequency combinations capable of guiding the user into synchronous mind-brain states of his or her choice.

In a fascinating twist, Hemi-Sync brain states can be learned and recreated at will. In other words, with suitable training, the individual is able to kick into a synchronous mind-brain state when the occasion demands, without the use of the sustained audio stimulus. Imagine board level executives having access to highly creative thought modalities while on the job! This is now a reality.

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But what of the applications? First and foremost, the technology creates a fertile substrate for all other learning techniques. Humility precludes the suggestion that Dr de Bono's thinking tools might well be used to greater effect if embedded in a synchronous brain state. Classroom environments in the USA, however, have long benefited from the technology. Focused attention, co-operativeness, calm and centered behaviour among school children are all by-products of synchronous sound. Dr Lozanov's superlearning state can now be accurately targeted and induced. With the technology the fields of learner-directed behaviour modification and affirmative learning have become whole new ball games.

Closer to home, the Brain Technologies division of The Foundation for Human Advancement is investigating the possibility of the use of the technology in counteracting the effects of cognitive deprivation among black pre-primary and primary school children. The USA has made great strides in the treatment of cerebral palsied and other disabled children using the technology. The gains which could be made by normal children using synchronous sound are, as yet, highly speculative. But all the signs point to a potential winner.

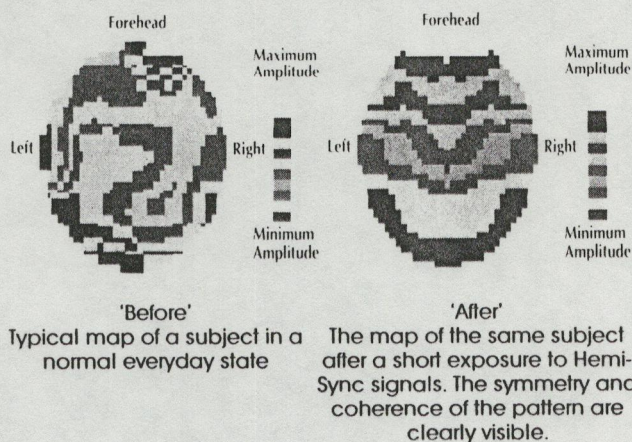
Within the corporate environment, numerous applications of the technology are available.

Ultimately, any stress management programme worth its salt must be geared towards teaching practical and effective relaxation techniques, and should instill a commitment to the process within the participant. Inevitably, this is where most programmes fall down. Replete with scare tactics, jargon, exhortations and positive affirmations, individuals go in stressed, and come out as highly stressed experts on stress. And that's where it ends.

Hemi-Sync's ability to induce deep states of relaxation fulfils both criteria for effective stress management. It provides a practical, accessible and empirical method of relaxation which allows the participant to perceive immediate benefit from the

Figure 1

Topographic contour maps of electrical activity within neocortex of human brain, monitored in the range 4-8 Hz (Theta activity)



process. Secondly, the sense of well-being which suffuses the individual during the exercise, and pervades long after, is sufficient to make the individual want to repeat the process as often as possible. In addition, training based on the technology can permanently install a relaxation response to external stressors, giving the user a powerful tool to manage stress in pressure situations which require calm and objective decision making.

Creativity training is another area addressed. It is common cause that our "left brain" dominant socialisation has impacted on our ability to solve problems and innovate without diving into a text book or relegating the function to someone else. Synchronous brain states, or states of "whole brain thinking" allow employees to access creative and intuitive levels in the work place, with the result that pro-active problem solving and innovation becomes the norm.

Accelerating corporate culture change is a field of application where the technology has produced startling results. Its use in individual and group management training has significantly increased commitment to performance.

The list of applications, current and potential, is endless. The bottom line is performance improvement, whichever field of endeavour is being addressed.

The Monroe Institute's ongoing research is dedicated to the growth of human consciousness and empowerment of the mind-brain. Where possible, conventional scientific techniques and protocol are applied. Over the years they have built up an extremely accurate physiological yardstick by which to gauge changes in states of consciousness. Neuro-mappers, galvanic skin response meters, skin potential voltage meters are some of the technologies used in their investigations. Much of their work has been verified by independent researchers and they actively encourage and assist such verification through the release of information.

In the final analysis, how do you tell an 18 year old victim of brain trauma, condemned to a life of severe speech and motor dysfunction, that he cannot use one or other rehabilitative technique owing to the fact that its development does not strictly conform to an outmoded protocol? You can't. □

References available on request.